Spot Safety Project Evaluation

Project Log # 200602154

Spot Safety Project # 11-00-210

Project Evaluation of the Construction of a Roundabout at the Intersection of SR 1716-SR 1713 (Yellowbanks Rd) at SR 1716-SR 1707 (Haymeadow Rd) in Wilkes County

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation

Principal Investigator

_____ _____
Carrie L. Simpson, EI Date

Traffic Safety Project Engineer

Project Evaluation Documentation

Subject Location

The Intersection of SR 1716-SR 1713 (Yellowbanks Rd) at SR 1716-SR 1707 (Haymeadow Rd) Wilkes County

Project Information

The project improvement countermeasure chosen for the subject location was the construction of a roundabout. Prior to the project improvement, the location was controlled by stop signs on SR 1716-Haymeadow Rd and SR 1707-Haymeadow Rd. A 35-mph advisory speed was posted on the intersection warning signs located on the Yellowbanks Road approaches to the intersection. The intersection is located at the top of a crest vertical curve. The speed limit on all approaches is 55 mph.

The initial crash analysis for this location was completed from January 1, 1998 through December 31, 2000 with a total of two reported crashes. According to the initial crash analysis, there was one Angle crash and one Sideswipe crash that were both considered "correctable" crashes. These crashes resulted in one class-C injury.

According to the *Project Justification Sheet* in the Project File Folder, Charles Wooten (Wilkes County School Transportation Director) originally requested this project. The primary purpose of the project was to alleviate the potential for collisions at a new middle school driveway intersecting with SR 1716-Yellowbanks Road, located just west of the treatment location. The sight distance to and from the school driveway was restricted due to a crest vertical curve on SR 1716-Yellowbanks Road. The middle school was opened in August 2002. The project file also noted that this location had experienced problems with vehicles travelling above the posted speed and that the intersection geometrics could have caused vehicles to become airborne if driven too fast. The intent of the roundabout was to slow vehicles on Yellowbanks Road and to reduce the potential for accidents at the proposed school entrance. The project improvement was completed on August 15, 2002 at a cost of approximately $300,000.

Naïve Before and After Analysis

After reviewing the spot safety file folder along with all the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period was from July 1, 2002 through September 30, 2002. The before period consisted of reported crashes from October 1, 1998 through June 30, 2002 (3 Years, 9 Months) and the after period consisted of reported crashes from October 1, 2002 through June 30, 2006 (3 Years, 9 Months). The ending date for this analysis was determined by the available crash data at the time the crash analysis was completed. The treatment data consisted of all crashes within 150 feet of the treatment intersection. Please see the attached *Location Map* for further detail.

The following data table depicts the Naive Before and After Analysis for the treatment intersection. Please note that Frontal Impact Crashes were the target crashes for the applied countermeasure. The Frontal Impact Crash types considered are as follows: Left turn, same roadway; Left turn, different roadways; Right turn, same roadway; Right turn, different roadways; Head on; and Angle.

Treatment Information	**Before**	**After**	**Percent Reduction (-)/ Percent Increase (+)**
Total Crashes	5	3	-40.0%
Total Severity Index	6.92	5.93	-14.3%
Target Crashes	3	0	-100.0%
Target Severity Index	5.93	0	-100.0%
Volume	3300	2800	-15.2%

Target Crash Information	**Before**	**After**	**Percent Reduction (-)/ Percent Increase (+)**
Fatal Injury Crashes	0	0	N/A
Non-Fatal Injury Crashes	2	0	-100.0%
Total Injury Crashes	2	0	-100.0%
Night Crashes	0	0	N/A
Wet Crashes	0	0	N/A

The naïve before and after analysis at the treatment location resulted in a 40 percent decrease in Total Crashes, a 100 percent decrease in Target Crashes, and 15 percent decrease in Average Daily Traffic (ADT). The before period ADT year was 2000 and the after period ADT year was 2004.

Results and Discussion

The naïve before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 40 percent decrease in Total Crashes and a 100 percent decrease in Target Crashes. The number of Total Crashes decreased from five crashes in the before period to three in the after period. The summary results above demonstrate that when using the naive before and after analysis method the treatment location appears to have had a reduction in the frequency and severity of crashes from the before to the after period.

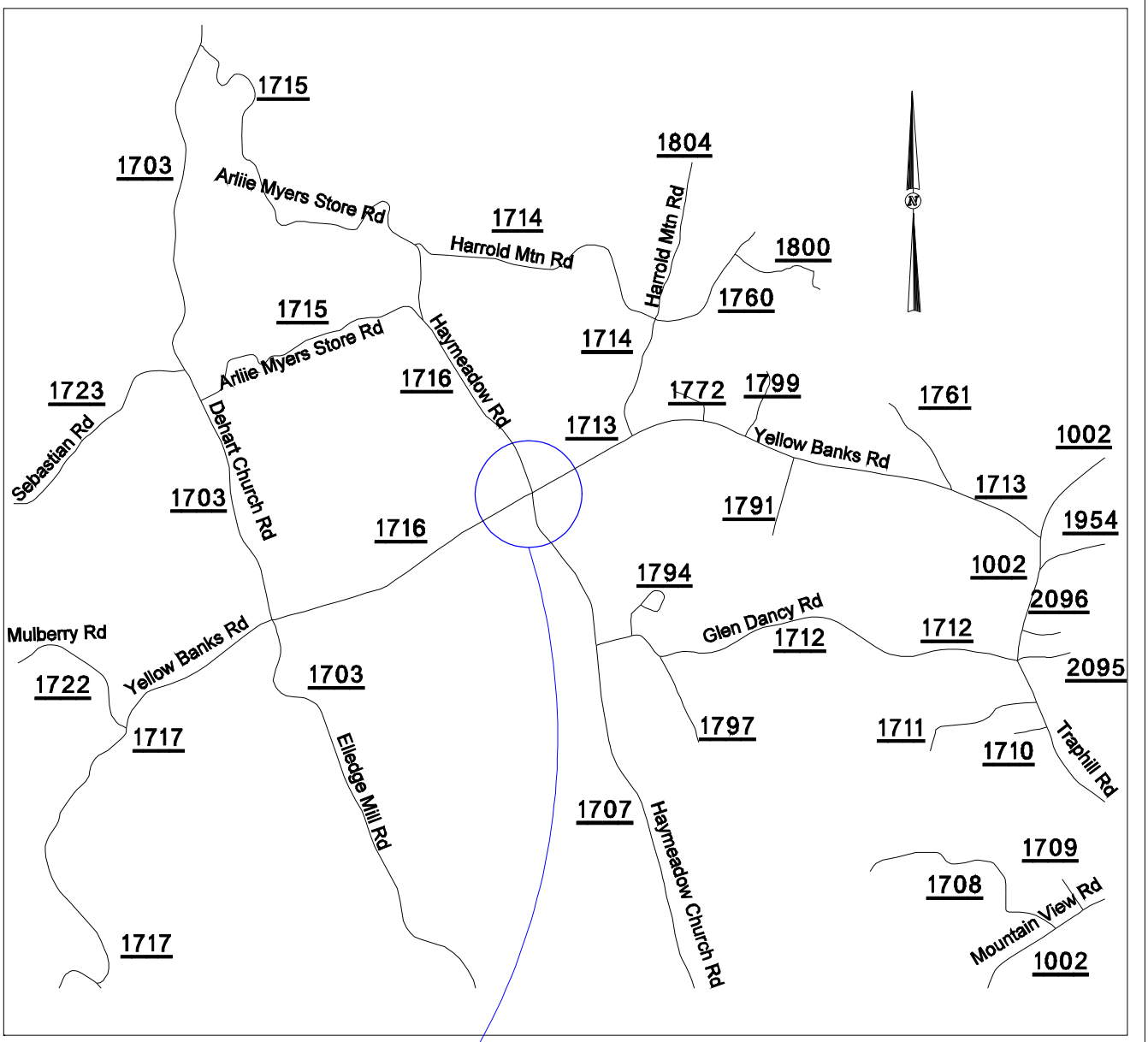
Although there was a reduction in the number of Target Crashes at the treatment location, only three Target Crashes occurred in the entire three-year before period. The Target Crashes in the before period included two Angle Crashes and one Left Turn-Same Roadway Crash, resulting in four class-C injuries. It appears that there was a minimal crash pattern at the treatment location in the before period and that the project was set up based on crash potential, not actual before period crashes.

There were no Target Crashes in the after period at the treatment location. The three Total Crashes that occurred involved one Rear End Crash, one Sideswipe Crash, and one Animal Crash. The Rear End Crash involved a volunteer fireman failing to reduce his speed while responding to a call and rear-ending the vehicle in front of him stopped at the yield sign. The Sideswipe Crash involved a motorist colliding with another vehicle while attempting to enter the roundabout.

As previously stated, the intent of the roundabout was to slow vehicles on Yellowbanks Road and to reduce the potential for accidents at the newly constructed school entrance. The school entrance is located approximately 0.2 miles west of the treatment intersection on SR 1716-Yellowbanks Road. Since the school has opened in August 2002, there have been three reported crashes at its entrance on SR 1716-Yellowbanks Road. The three crashes include three Left Turn Crashes, resulting in one class B injury crash.

As the Safety Evaluation Group completes additional reviews for this type of countermeasure, we will be able to provide more objective and definite information regarding actual crash reduction factors.

Location Map
Spot Safety Project 11-00-210
Wilkes County



Treatment Location:

SR 1716 / SR 1713 (Yellowbanks Rd) at
SR 1716 / SR 1707 (Haymeadow Rd)

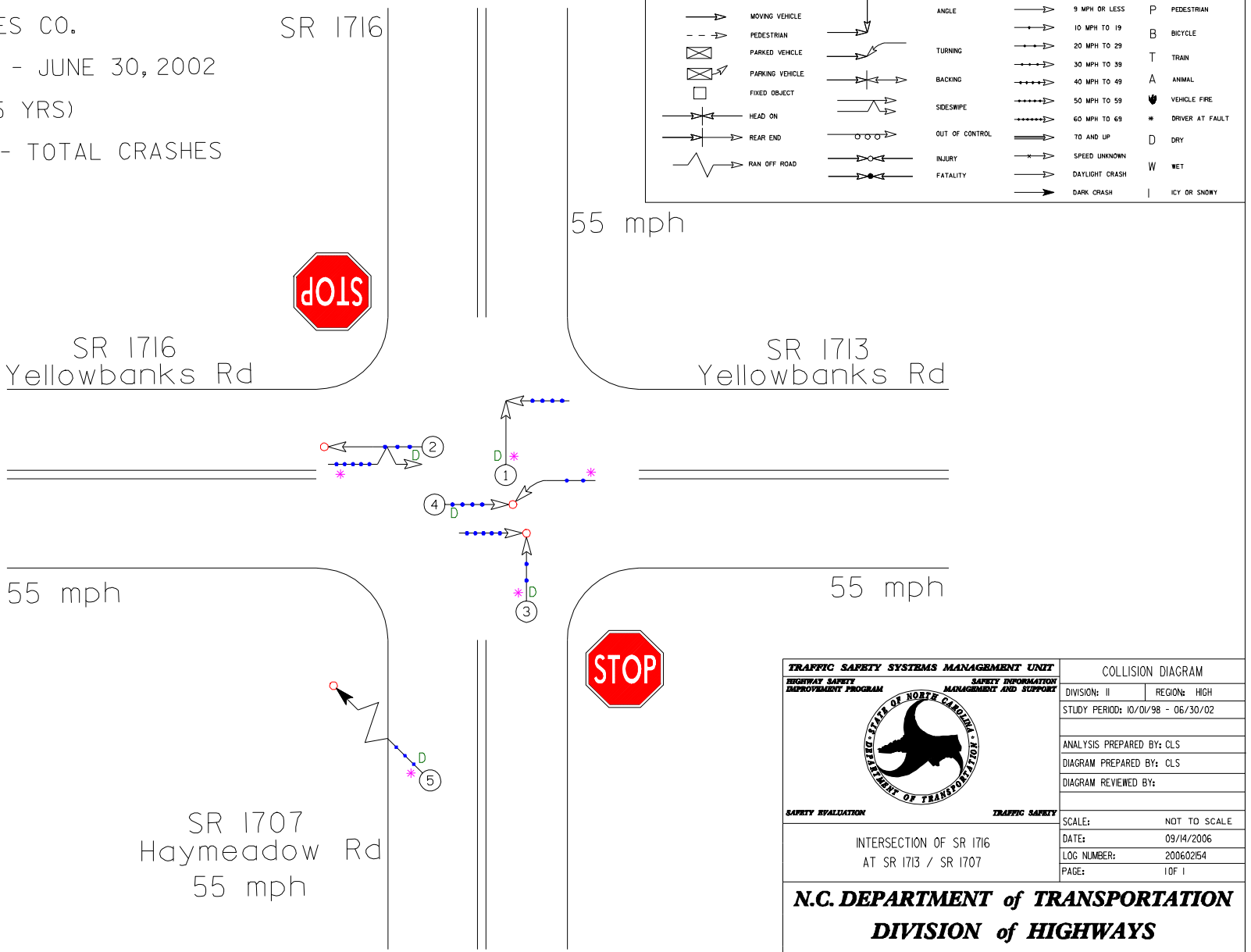
SR 1716 AT SR 1713 AND SR 1707

WILKES CO.

OCTOBER 1, 1998 - JUNE 30, 2002

(3.75 YRS)

BEFORE PERIOD - TOTAL CRASHES



LEGEND

MOVING VEHICLE	ANGLE	9 MPH OR LESS	P	PEDESTRIAN
PEDESTRIAN		10 MPH TO 19	B	BICYCLE
PARKED VEHICLE	TURNING	20 MPH TO 29	T	TRAIN
PARKING VEHICLE		30 MPH TO 39	A	ANIMAL
FIXED OBJECT	BACKING	40 MPH TO 49		VEHICLE FIRE
HEAD ON	SIDESWIPE	50 MPH TO 59	*	DRIVER AT FAULT
REAR END		60 MPH TO 69	D	DRY
RAN OFF ROAD	OUT OF CONTROL	70 AND UP	W	WET
	INJURY	SPEED UNKNOWN		
	FATALITY	DAYLIGHT CRASH		ICY OR SNOWY
		DARK CRASH		

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SAFETY INFORMATION MANAGEMENT AND SUPPORT

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

SAFETY EVALUATION

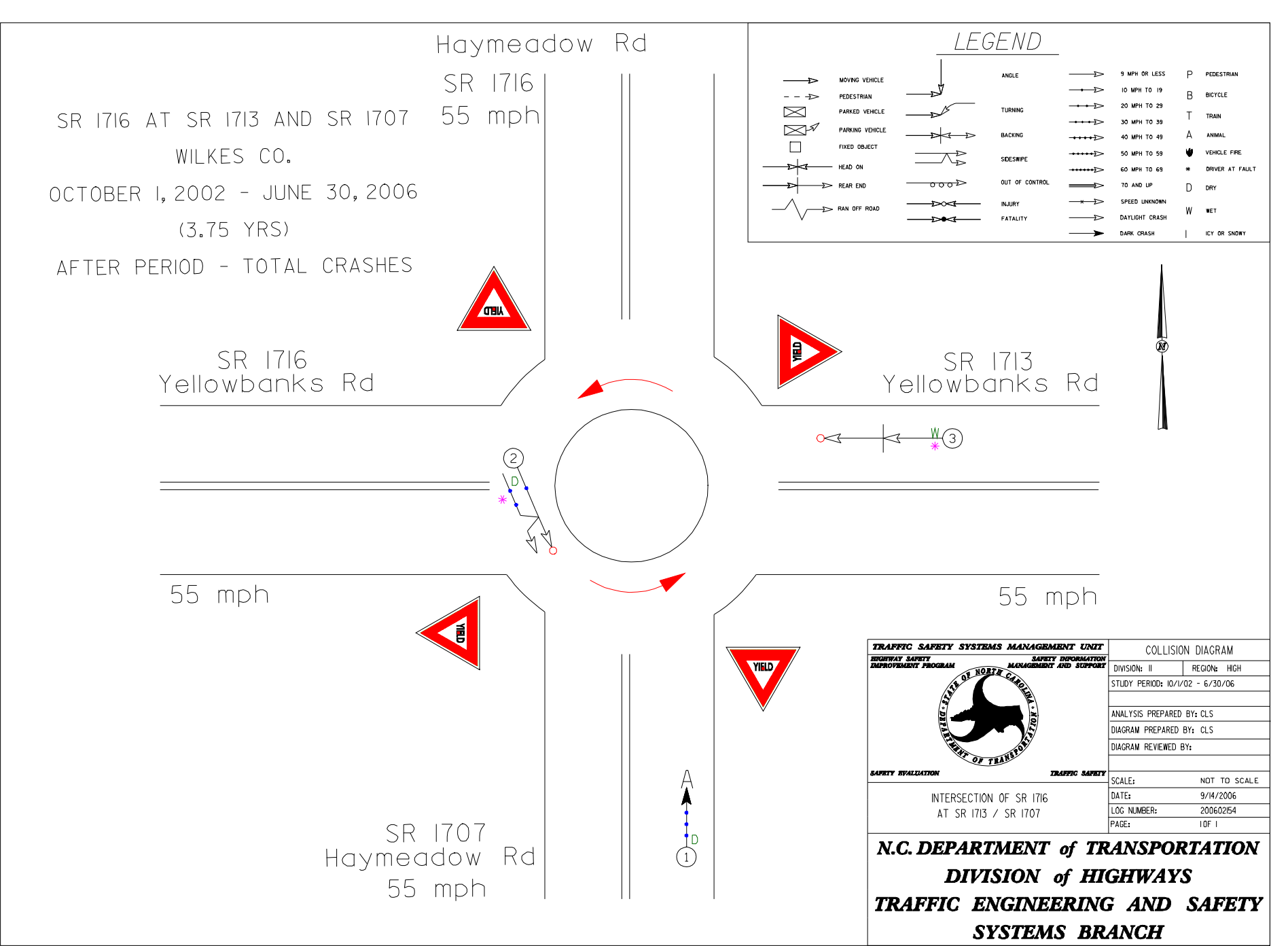
TRAFFIC SAFETY

INTERSECTION OF SR 1716
AT SR 1713 / SR 1707

COLLISION DIAGRAM

DIVISION: II	REGION: HIGH
STUDY PERIOD: 10/01/98 - 06/30/02	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: CLS	
DIAGRAM REVIEWED BY:	
SCALE:	NOT TO SCALE
DATE:	09/14/2006
LOG NUMBER:	200602154
PAGE:	1 OF 1

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH



TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

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SAFETY EVALUATION | TRAFFIC SAFETY

INTERSECTION OF SR 1716
AT SR 1713 / SR 1707

COLLISION DIAGRAM

DIVISION: 11	REGION: HIGH
STUDY PERIOD: 10/1/02 - 6/30/06	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: CLS	
DIAGRAM REVIEWED BY:	
SCALE:	NOT TO SCALE
DATE:	9/14/2006
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N.C. DEPARTMENT of TRANSPORTATION
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TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH